Appendix G

WATER AND SEWER STUDIES

SEWER STUDY

SEWER STUDY FOR THE WESTFIELD PLAZA CAMINO REAL EXPANSION PROJECT IN THE CITY OF CARLSBAD

June 26, 2008

Prepared by:
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Job No. 891-001

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Attention: A. J. Taranton Jr., Director of Development

Subject: Sewer Study for the Westfield Plaza Camino Real Expansion Project in the City of Carlsbad

Introduction

The Westfield Plaza Camino Real project is located in the City of Carlsbad within the County of San Diego. The project is situated along the northern border of the City and along the City of Oceanside boundary. Specifically, the project is bound by Highway 78 to the north, Marron Road to the south, El Camino Real to the east, and the North County Plaza shopping area to the west. Figure 1 provides a location map for the project.

The Westfield Plaza Camino Real presently consists of 1,130,037 square feet of gross leasable area (ft^2 GLA). Expansion of the project site will include the demolition of 196,567 ft^2 GLA and construction or renovation of 342,500 ft^2 GLA for a total of 1,275,970 ft^2 GLA at project completion.

The purpose of this letter report is to determine the wastewater flows generated by the proposed project and assess the impact of these flows on the City of Carlsbad's sewer system and treatment capacity.

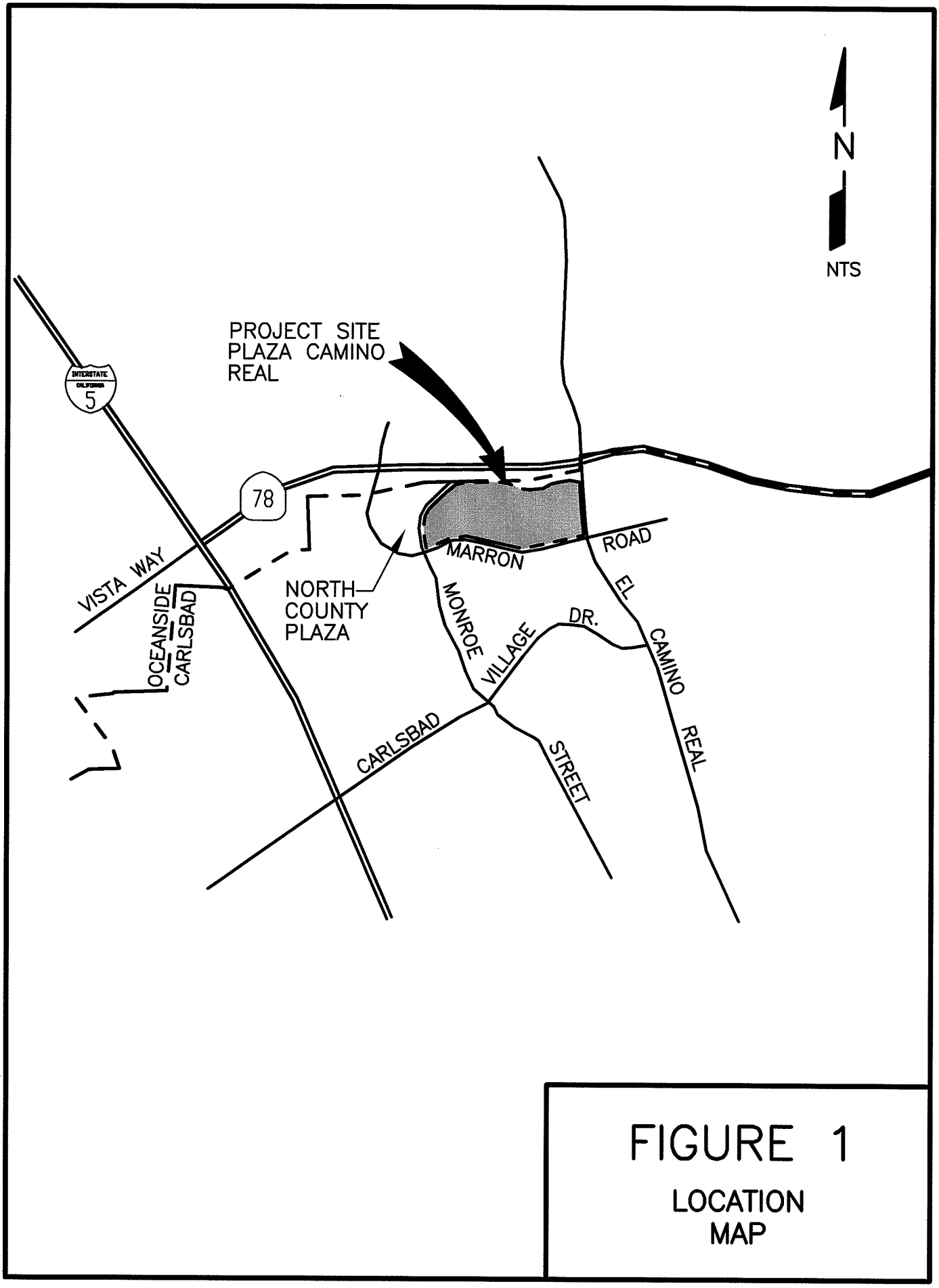

FIGURE 1

LOCATION MAP

Existing Sewer System

The City of Carlsbad is divided into 25 local facility management zones (LFMZ) and each of these zones is divided into drainage sub-basins based on the gravity flow of wastewater. The Plaza Camino Real project is located in drainage sub-basin 1A which drains to the Vista/Carlsbad Interceptor. Flows through this Interceptor are ultimately conveyed to the Encina Wastewater Authority's Encina Water Pollution Control Facility (Encina WPCF) for treatment. The following sections will discuss the existing sewer system, existing wastewater flows, and treatment facility which will serve the project.

Sewer System Piping. In addition to the sewer laterals which serve the Plaza Camino Real project directly, there are three additional wastewater pipelines crossing through the project boundary. The first is the Vista/Carlsbad Interceptor which transitions from a 42-inch pipe, known as reach VC2, to a 36-inch pipe, known as reach VC3, just northwest of the existing Firestone Tire building. The second is a 15-inch sewer line which serves development south of the project in drainage sub-basins 1A and 2A. This 15-inch sewer line discharges into reach VC2. The third is a 10-inch sewer line which serves development south of the project in drainage sub-basin 1B and discharges into reach VC3. Figure 2 illustrates the location of these sewer pipelines.

The Vista/Carlsbad Interceptor runs from approximately the City of Oceanside/City of Carlsbad boundary near College Boulevard west along Highway 78 to the Buena Vista Pump Station. At the start of the Interceptor is the Vista/Oceanside Flow Meter, V1. This first reach of the Interceptor is known as VC1 and is 36-inch in diameter. Heading west, this pipe transitions to the 42-inch reach VC2 and then to the 36-inch reach VC3 which discharges to the Buena Vista Pump Station. The Buena Vista Pump Station force main, known as VC4, discharges to the gravity sewer reach VC5 just west of Interstate 5 and continues south through reaches VC6 through VC11, the Agua Hedionda Pump Station, and reaches VC12 through VC15 to discharge at the Encina WPCF.

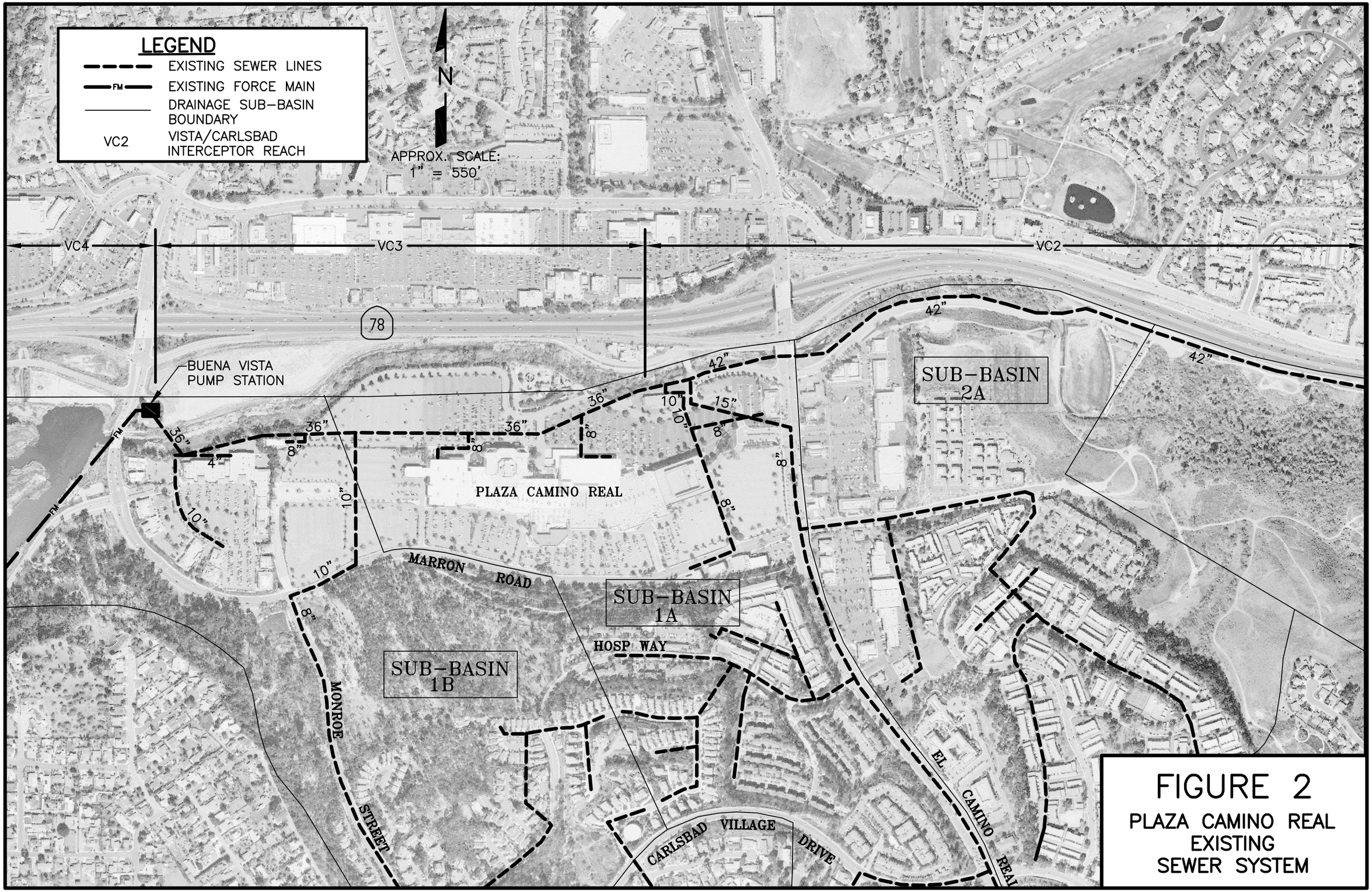

FIGURE 2

PLAZA CAMINO REAL EXISTING SEWER SYSTEM

\\PACIFIC\DWG\891001\SEWER\FIGURE-2.DWG 06-25-08 13:25:42 LAYOUT: LAYOUT1

Existing Wastewater Flows. To evaluate the existing wastewater flows through reaches VC2 and VC3, the *City of Vista and Buena Sanitation District Sewer Master Plan Update 2008* (Vista 2008 Master Plan) was used to determine the flow rate through the flow meter V1. The majority of the wastewater flow measured by this meter is generated in the City of Vista; some of the flow is generated by the City of Oceanside. For City of Carlsbad flows, the *City of Carlsbad Sewer Master Plan Update March 2003* (Carlsbad 2003 Master Plan) was used.

Average Dry Weather Flows. To determine the average dry weather flow through reaches VC2 and VC3, the following flows (and their source) were accumulated:

1. Existing wastewater flow through flow meter V1 (Vista 2008 Master Plan),
2. Existing, as of 2003, City of Carlsbad sewer sub-basins which drain to reaches VC2 and VC3 (Carlsbad 2003 Master Plan, Table 4-4), which includes the existing Plaza Camino Real flows,
3. Projected City of Carlsbad development, beyond 2003, within same sub-basins which drain to reaches VC2 and VC3 (Carlsbad 2003 Master Plan, Table 8-1).

For the Carlsbad projected development beyond 2003, it was conservatively assumed that all of these projects are presently generating wastewater. Additionally, the projections were made based on the entire local facility management zone rather then by sub-basin. Again to be conservative, the entire local facility management zone projection was included.

Peak Wet Weather Flows. To determine the existing peak wet weather flows through reaches VC2 and VC3, the inflow and infiltration (I&I) rates were added to the average dry weather flows. The City of Vista I&I contribution is based on the flow rate that the Vista 2008 Master Plan model projected of 8.64 mgd. For the City of Carlsbad contribution, the Carlsbad 2003 Master Plan determined an I&I rate of 5.6 mgd for the

entire Vista/Carlsbad and North Agua Hedionda Interceptor System at ultimate buildout. For the Carlsbad I&I rate, assuming that it is distributed evenly over the length of the Interceptor System, the flow through reaches VC1, VC2, and VC3 was calculated as the ratio of their combined length (approximately 11,000 feet) to the total length of the Vista/Carlsbad and North Agua Hedionda Interceptor System (approximately 50,000 feet). The I&I rate through reaches VC1, VC2, and VC3 is therefore approximately 1.232 mgd.

Table 1 shows the accumulation in flows described above to determine the average dry weather and peak wet weather flows through reaches VC2 and VC3.

TABLE 1
EXISTING WASTEWATER FLOWS THROUGH INTERCEPTOR REACHES VC2 AND VC3

Flow Contribution	Average Dry Weather Flow		Inflow and Infiltration Rates, mgd	Peak Wet Weather Flow, mgd
	mgd	gpm		
V1 Flow Meter Total	**5.57**	**3,868**	**8.64**	**14.21**
City of Carlsbad				
Up to 2003				
Sub-basin 1A	0.163	113	-	-
Sub-basin 1B	0.068	48	-	-
Sub-basin 2A	0.212	147	-	-
After 2003				
LFMZ 1	0.276	192	-	-
LFMZ 2	0.036	25	-	-
City of Carlsbad Total	**0.755**	**525**	**1.232**	**1.987**
TOTAL	**6.325**	**4,393**	**9.872**	**16.197**

Existing Capacity. Reaches VC2 and VC3 are made up of several lengths of the same diameter pipe. The capacity of reaches VC2 and VC3 at a ratio of depth of flow to pipe diameter (d/D) of 0.75 is approximately 26.7 mgd and 17.6 mgd, respectively. At a d/D ratio of 0.90 the capacities of reaches VC2 and VC3 are 31.2 mgd and 20.6 mgd, respectively. These capacities were determined using a slope of 0.002 ft/ft and a Manning's "n" of 0.013.

Buena Vista Pump Station and Force Main

Wastewater flows through reach VC3 discharge to the Buena Vista Pump Station wet well. The pump station has a firm pumping capacity of 21.5 mgd, per the Carlsbad 2003 Master Plan. Presently, there are parallel 24-inch and 16-inch force mains from the pump station. The City is planning to rehabilitate the existing 24-inch and replace the 16-inch with a 24-inch during the 2008-2009 fiscal year. This upgrade was recommended in the Carlsbad 2003 Master Plan.

Sewage Treatment Facility

In the Carlsbad 2003 Master Plan, meter data from August 2001 was utilized to determine the City's existing flows to the Encina WPCF. Of the City's 9.24 mgd capacity right, approximately 6.8 mgd is being utilized. Planned expansions of the facility include increasing capacity from the existing 22.5 mgd to 36.0 mgd in the year 2017-2022 timeframe. An additional increase to 45-60 mgd is planned beyond year 2022.

Project Wastewater Generation

Utilizing the building area square footage of the existing and proposed Plaza Camino Real project and the Carlsbad 2003 Master Plan, the wastewater flow generated by

each scenario was determined. The average dry weather flow rate was determined based on the non-residential generation rate of 1,150 gallons per day per 10,000 square feet of building area. Peak wet weather flow was estimated in the Carlsbad 2003 Master Plan to be 2.9 times the average dry weather flow for this Interceptor system. Table 2 below summarizes these flows.

TABLE 2
PLAZA CAMINO REAL WASTEWATER GENERATION

Project	Building Area, sf	Average Dry Weather Flow		Peak Wet Weather Flow,
		mgd	gpm	mgd
Existing	1,130,037	0.130	90.2	0.377
Proposed	1,275,970	0.147	101.9	0.426
Net Change	**+ 145,933**	**0.017**	**11.7**	**0.049**

Impact of Proposed Project

From the existing development onsite the Plaza Camino Real project, redevelopment plans will increase the project building area square footage by 145,933 square feet. The following section will discuss the impact of this expansion on the City's wastewater conveyance system and treatment capacity.

Sewer System Piping. To assess the impact of the project expansion on the wastewater conveyance system, the net increase in wastewater generated by the site was added to the existing flow through reaches VC2 and VC3. This results in an average dry weather flow through reaches VC2 and VC3 of 4,404.7 gpm or 6.342 mgd. For peak wet weather flows, the total flow through reaches VC2 and VC3 would be approximately 11,144.4 gpm or 16.246 mgd. In comparing these flows to the pipe reach

capacities, in neither case is the d/D requirement of 0.75 exceeded. Therefore, the existing wastewater piping can accommodate the proposed expansion.

Buena Vista Pump Station and Force Main. As discussed previously, the Carlsbad 2003 Master Plan indicated that the firm pumping capacity of the Buena Vista Pump Station is 21.5 mgd. Therefore, based on the total peak wet weather flow of 16.246 mgd, the pump station will be able to accommodate the proposed expansion. Additionally, as the force main and gravity sewer system downstream of the pump station are designed to accommodate the pump station discharge at a minimum, the remainder of the Vista/Carlsbad Interceptor will be able to accommodate the proposed expansion.

Sewage Treatment Facility. From the existing City wastewater generation rate of 6.8 mgd, the Carlsbad 2003 Master Plan projected approximately 8.9 mgd of wastewater to be generated by the District's service area after October 2003. It also projected an ultimate flow rate of 9.87 mgd at buildout of the City. Carlsbad's present capacity at the Encina WPCF is 9.24 mgd. In comparing the ultimate flow projections to the current capacity, an increase in Carlsbad's capacity rights would be necessary. From Carlsbad's planning department information however, the City is not expected to reach buildout for some time. As such, it is not anticipated that the additional 0.017 mgd of wastewater generated by the Westfield Plaza Camino Real project expansion will necessitate an immediate increase in capacity at the Encina WPCF.

City of Carlsbad Planned Improvements

The Carlsbad 2003 Master Plan identified reach VC3 as exceeding the depth to diameter criteria based on potential flows and I&I rates that could occur and was not based on actual recorded flows. The Master Plan recommended replacing the 3,350-foot reach with 42-inch piping. In their 2008-2009 Operating Budget, the City has

included the replacement of VC3 on their capital improvement project (CIP) list to be implemented in the 2011-2012 timeframe. This timeframe was also confirmed with City staff. As discussed previously, the City will be upgrading the Buena Vista Pump Station force mains in the coming year.

Summary and Conclusions

The Plaza Camino Real project is proposing to increase its building square footage by 145,933 sf. This results in a net increase in wastewater flow generated by the site of 0.017 mgd average dry weather flow and 0.049 mgd peak wet weather flow. The addition of these flow to the existing wastewater flow through reaches VC2 and VC3 of the Vista/Carlsbad Interceptor will not cause either reach to flow greater than 75 percent full by depth. Additionally, capacity is available in the Buena Vista Pump Station and force mains, the remainder of the Vista/Carlsbad Interceptor, and the Encina WPCF to accommodate the proposed expansion.

Thank you for the opportunity to assist you with the sewer system planning for the Plaza Camino Real project. If you have any questions regarding the information presented in this report, please do not hesitate to call.

Dexter Wilson Engineering, Inc.

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January 25, 2010

891-001

Hofman Land Planning and Engineering
3152 Lionshead Avenue
Carlsbad, CA 92010

Attention: Bob Wojcik, P.E., Hofman Land Planning and Engineering

Subject: Update to Water and Sewer Studies for the Westfield Plaza Camino Real Expansion Project in the City of Carlsbad

In June 2008 Dexter Wilson Engineering, Inc. prepared water and sewer capacity studies for the Westfield Plaza Camino Real expansion project. The following two studies were completed:

1. Water Study for the Westfield Plaza Camino Real Expansion Project in the City of Carlsbad, Dexter Wilson Engineering, Inc., June 25, 2008.
2. Sewer Study for the Westfield Plaza Camino Real Expansion Project in the City of Carlsbad, Dexter Wilson Engineering, Inc., June 26, 2008.

These studies were based on the expected expansion of the Westfield Plaza Camino Real commercial site by a net total of 145,933 square feet. A portion of this expansion included demolition or renovation of existing buildings. The balance was new construction.

The water and sewer studies prepared for the project in June 2008 concluded that adequate water and sewer service is available to the commercial site taking into consideration the proposed expansion of 145,933 square feet.

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Current expansion proposals for Westfield Plaza Camino Real have been modified with the result that the net expansion of commercial area is reduced to 35,417 square feet. This reduction from the June 2008 proposal has the direct consequence of reducing the water demand and sewer generation of the proposed expansion project. Thus, the potential impacts to the City of Carlsbad water and sewer systems will be less than analyzed in the June 2008 studies.

Therefore, we conclude that the project as currently proposed will not have significant impacts on the water and sewer systems and that these services can be provided to the proposed project without offsite improvements.

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